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*Indian Standard*

SHIPBUILDING — TOPPING WINCHES  
( *First Revision* )

ICS 47.020.50

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BUREAU OF INDIAN STANDARDS  
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NEW DELHI 110002

## NATIONAL FOREWORD

This Indian Standard (First Revision) which is identical with ISO 6555 : 1988 'Shipbuilding — Topping winches' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Marine Engineering and Safety Aids Sectional Committee and approval of the Transport Engineering Division Council.

This Indian Standard was first issued in 1978. The present revision has been taken up to harmonize it with the latest version of ISO Standard.

The text of the International Standard has been proposed to be approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
- Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

## CROSS REFERENCES

In this adopted standard reference appears to certain International Standards listed below for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their places are given below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 2408 : 1985 Steel wire ropes for general purposes — Characteristics	IS 2266 : 2002 Steel wire ropes for general engineering purposes — Specification (fourth revision)	Technically equivalent
ISO 2944 : 1974 Fluid power systems and components — Nominal pressures	—	—
ISO 3828 : 1984 Shipbuilding and marine structures — Deck machinery — Vocabulary	IS 8650 (Parts 1 to 5) 1989 Shipbuilding — Deck machinery — Glossary of terms and graphical symbols	Technically equivalent
ISO 4413 : 1979 Hydraulic fluid power — General rules for the application of equipment to transmission and control systems	—	—
ISO 7825 : 1985 Shipbuilding — Deck machinery — General requirements	IS 12719 : 1989 Shipbuilding — Deck machinery — General requirements	Equivalent
IEC 92 (1965 to 1988) Electrical installations in ships	—	—
IEC 529 (1976) Classification of degrees of protection provided by enclosures	IS 12063 : 1987 Classification of degrees of protection provided by enclosures of electrical equipment	Equivalent

*(Continued on third cover)*

*Indian Standard*

# SHIPBUILDING — TOPPING WINCHES

## (First Revision)

### 1 Scope

This International Standard specifies requirements and characteristics of lightly powered and externally powered topping winches as used in derrick cargo-handling gear. The lightly powered topping winches include winches with electric or hydraulic drive.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2408 : 1985, *Steel wire ropes for general purposes — Characteristics*.

ISO 2944 : 1974, *Fluid power systems and components — Nominal pressures*.

ISO 3828 : 1984, *Shipbuilding and marine structures — Deck machinery — Vocabulary*.

ISO 4413 : 1979, *Hydraulic fluid power — General rules for the application of equipment to transmission and control systems*.

ISO 7825 : 1985, *Shipbuilding — Deck machinery — General requirements*.

IEC 92 : 1965 to 1988, *Electrical installations in ships*.

IEC 529 : 1976, *Classification of degrees of protection provided by enclosures*.

### 3 Definitions

For the purposes of this International Standard, the definitions given in ISO 3828 and the following definitions apply.

**3.1 nominal size:** Figures derived from the drum load and holding load, used in designation and marking.

**3.2 drum load:** Maximum load in a topping rope measured at the drum exit while hauling-in the rope at the nominal speed, the first layer of the rope being wound onto the drum.

**3.3 messenger rope:** Rope used for transferring torque from a powered winch to an externally powered winch.

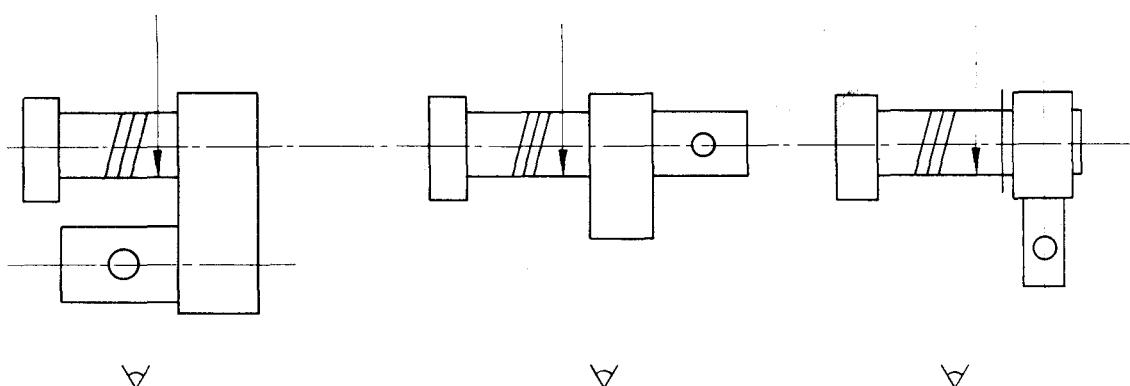


Figure 1 — Examples of lightly powered right-hand topping winches

### 3.4 Winch side

**3.4.1 lightly powered right-hand topping winch:** Winch where the reduction gear or the drum drive is on the right-hand side of the drum, in relation to an observer situated on the side of the motor or power supply. (See figure 1.)

**3.4.2 lightly powered left-hand topping winch:** Winch where the reduction gear or the drum drive is on the left-hand side of the drum, in relation to an observer situated on the side of the motor or power supply.

**3.4.3 externally powered right-hand topping winch:** Winch where the topping rope is hauled-in on the right part and the messenger rope is hauled-in on the left part of the drum, in relation to an observer situated on the side of hauling-in the messenger and topping ropes. (See figure 2.)

**3.4.4 externally powered left-hand topping winch:** Winch where the topping rope is hauled-in on the left part and the messenger rope is hauled-in on the right part of the drum, in relation to an observer situated on the side of hauling-in the messenger and topping ropes. (See figure 2.)

## 4 Design and operation

### 4.1 General requirements

Topping winches shall meet the general requirements for deck equipment in ISO 7825 and the specific requirements given in 4.2 to 4.10.

NOTE — Attention is drawn to the existence of national safety regulations in certain countries affecting the rope end attachment.

### 4.2 Drum

**4.2.1** The drum length shall be such that the topping rope can be fully accommodated in not more than three layers, the complete length of the rope being evenly reeled.

**4.2.2** The drum diameter shall not be less than 16 times the topping rope diameter.

**4.2.3** The flange height shall be such that with the rope evenly wound, it will project at least 2,5 topping-rope diameters beyond the outermost layer of the rope.

**4.2.4** The externally powered topping winch may be fitted with a split drum to separate the messenger rope from the topping rope.

### 4.3 Drum-locking devices

The drum may be provided with a locking device. It shall be capable of withstanding at least 1,5 times the holding load.

The locking device shall be interlocked with a winch control so that lowering the derrick is impossible until the locking device has been disengaged.

If agreed with the appropriate national authority or classification society, a self-locking wormgear may be considered as a drum-locking device.

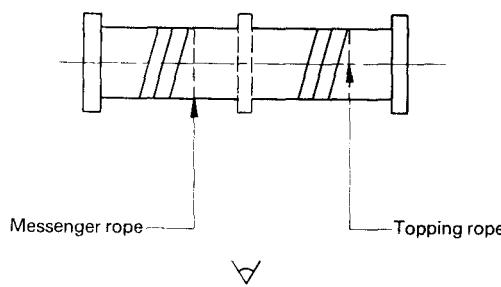
### 4.4 Control brake system

The lightly powered topping winch shall be provided with a braking system automatically applied to the prime mover when the control handle is in the "off" position, or when the power supply is cut off.

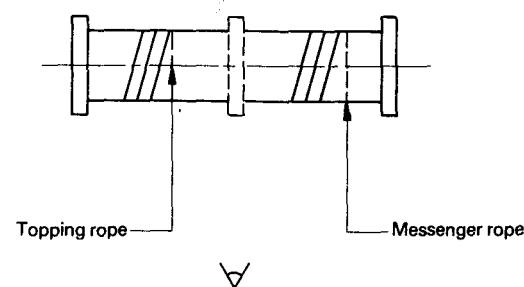
The control brake system shall be capable of effectively arresting and holding a load at the drum corresponding to at least 1,5 times the drum load; if the brake is to be used as a locking device, it shall hold at least 1,5 times the holding load.

### 4.5 Direction of motion of operating devices

The direction of motion of the operating devices of a lightly powered topping winch shall be such that the derrick is hoisted by a clockwise movement at a hand-wheel or crank handle or alternatively movement of a hand-lever towards the operator. The derrick shall be lowered with motion of the operating devices in the opposite direction.



a) right-hand winch



b) left-hand winch

Figure 2 — Examples of side of externally powered topping winches

#### 4.6 Speed control

If agreed between the purchaser and the manufacturer, a lightly powered topping winch may have speed control of the drum.

#### 4.7 Topping winch design

The design of the topping winch shall be based on the use of  $6 \times 37$  galvanized steel wire rope with fibre core in accordance with ISO 2408.

The nominal breaking strength of the wire shall be at least  $1\ 770\ N/mm^2$ .

#### 4.8 Emergency stop

The topping winch shall be fitted with a local emergency stop which cuts off the power supply or stops the operation of the winch drive.

#### 4.9 Material stresses

The stresses in component parts of the winch being acted upon by forces derived from the drum load or by forces derived from the holding load shall not exceed 0,4 times the 0,2 % proof stress of the material.

The stresses in component parts of the winch at maximum torque of the prime mover or being acted upon by at least 1,5 times the holding load shall not exceed 0,9 times the 0,2 % proof stress of the material.

#### 4.10 Drive equipment

**4.10.1** Electrical drives and control equipment shall conform to the requirements of IEC 92. Deck-mounted enclosures shall conform to IEC 529 IP 56.

**4.10.2** Hydraulic drives and control equipment shall conform to the requirements of ISO 4413. System nominal pressure shall be selected from ISO 2944 and the drive shall operate at a pressure 10 % below the selected nominal pressure, if agreed between the manufacturer and purchaser.

### 5 Characteristics

NOTE — Attention is drawn to the requirements of the Classification Societies.

**5.1** The topping winch shall be capable of continuous operation for a period of 5 min while exerting the drum load.

#### 5.2 Hauling overload

It shall be possible to overload the topping winch by 1,25 times the drum load.

**5.3** Nominal speed at drum load shall be not less than 0,15 m/s.

**5.4** Further characteristics shall be as indicated in table 1.

Table 1 — Performance data for topping winches

Nominal size	Drum load kN	Holding load kN	Design rope diameter mm	Rope strength min. kN
10 32	10	32	18	160
10 63	10	63	24	315
16 80	16	80	28	400
25 100	25	100	32	500
40 100	40	100	32	500
20 125	20	125	36	625

### 6 Acceptance tests

**6.1** The topping winch shall be tested as a complete unit (i.e. prime mover, drum, gearing and controls) at the manufacturer's works and on board the ship.

Externally powered winches shall be tested with the use of an external drive.

#### 6.2 Factory type-test

The factory type-test comprises the operations in 6.2.1 to 6.2.4.

##### 6.2.1 Operation under no-load

The winch shall be run for 10 min continuously, 5 min in each direction. While testing, the following shall be verified :

- a) tightness against oil leakage;
- b) temperature of bearings;
- c) power input;
- d) satisfactory operation of control brake system (for lightly powered winches);
- e) presence of abnormal noise.

##### 6.2.2 Operation under drum load

The winch shall hoist the test load (corresponding to the nominal drum load) to a height of 10 m and immediately lower the load. This test shall be performed twice. While testing, the following shall be verified:

- a) tightness against oil leakage;
- b) temperature of bearings;
- c) power input;
- d) nominal speed;
- e) satisfactory operation of drum-locking device, if fitted;
- f) satisfactory operation of control brake system.

### 6.2.3 Operation under holding load

The drum shall be held stationary and a load of at least 1,5 times the holding load shall be applied to a rope secured to and wound on the drum in a single layer. The load shall be held for a period of 2 min. While testing, the state of the drum-locking device and the component parts being acted upon by the load shall be checked.

### 6.2.4 Operation under at least 1,5 times drum load

The winch with the control brake system engaged shall hold a load corresponding to at least 1,5 times the drum load for a period of 2 min. While testing, the drum shall not rotate.

## 6.3 Individual tests at the manufacturer's works

Operation under no-load according to 6.2.1 and 6.2.2 e) shall be effected.

## 6.4 On-board test

The winch shall be tested as a unit of cargo-handling gear. The extent of the test shall be suited to the test of the cargo-handling gear, at least including the operations in 6.4.1 and 6.4.2.

### 6.4.1 The complete hoisting and lowering of an unloaded derrick twice.

### 6.4.2 Holding overload of the winch when the cargo-handling gear is being tested at 1,25 times the safe working load. While testing, the following shall be verified :

- a) tightness against oil leakage;
- b) satisfactory operation of the drum-locking device, if fitted;
- c) satisfactory operation of the control brake system.

## 7 Designation

Topping winches conforming to this International Standard shall be designated by the following indications, in the order given:

- a) denomination: topping winch;
- b) number of this International Standard: ISO 6555;
- c) type of winch: E for electric, H for hydraulic, EP for externally powered drive;
- d) nominal size (according to table 1);
- e) right- or left-hand winch (R or L) (see 3.4);
- f) split drum (add X only if the winch has a split drum: see 4.2.4);
- g) information on motive power: voltage and frequency of electric current, or hydraulic fluid pressure and flow rate.

### EXAMPLE

Designation of a topping winch according to ISO 6555, electrically powered (E), of nominal size 10 63, right-handed (R), without split drum, voltage 440 V and frequency 60 Hz:

**Topping winch ISO 6555 - E - 10 63 - R - 440/60**

## 8 Marking

Topping winches complying with this International Standard shall be permanently marked with the following information:

- a) number of this International Standard: ISO 6555;
- b) nominal size (see 3.1).

### EXAMPLE

**ISO 6555 - 10 63**

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The Technical Committee responsible for the preparation of this standard has reviewed the provisions of ISO 2944, ISO 4413, IEC 92 and has decided that they are acceptable for use in conjunction with this standard.

For BIS Certification Marking, details are available with the Bureau of Indian Standards.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

